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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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[REDACTED] ART UNIT [REDACTED] PAPER NUMBER

2841

DATE MAILED: 03/11/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|----------------------|-----------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 09/714,373 | ALCOE, DAVID J. |
| | Examiner | Art Unit |
| | Michael L. Lindinger | 2841 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-43 is/are pending in the application.
 - 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-43 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 - a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

| | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The Examiner acknowledges the corrections made to the Specification concerning the Amendment filed on February 8, 2002. The corrections have been noted and the Examiner's objections regarding this material are withdrawn.

Note the inclusion of the newly added Claims 42-43 within the below rejections.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-4, 8, 10, 11, 12, 20-22, 26, 28, 31-43 rejected under 35 U.S.C. 102(b) as being unpatentable by Appelt U.S. Patent No. 5,900,675. Regarding Claim 1, Appelt teaches an electronic device comprising a first substrate 630, a second substrate 620, and a flexible connector 610 attached between first and second substrate by a plurality of **alternating** contacts on a first 631-634 and second surface 612, 613 of the connector (Col. 5, lines 58+; Col. 6, lines 1+; FIG. 6).

Regarding Claims 2, Appelt teaches an electronic device wherein select contacts on the first surface of the connector 631-634 are offset from select contacts on the second surface 612, 613 of the connector (Col. 5, lines 58+; Col. 6, lines 1+; FIG. 6).

Regarding Claim 3, Appelt teaches an electronic device wherein the connector comprises a laminate material (Col. 5, lines 58+; Col. 6, lines 1+; FIG. 6).

Regarding Claim 4, Appelt teaches an electronic device wherein the laminate material comprises a core, a dielectric material surrounding the core, and a solder mask (Col. 5, lines 58+; Col. 6, lines 1+, Col. 7, lines 1+; FIG. 6).

Regarding Claim 8, Appelt teaches an electronic device wherein the core comprises a material selected from the group consisting of copper-invar-copper, copper, stainless steel, nickel, iron, and molybdenum (Col. 6, lines 1+, Col. 7, lines 1+).

Regarding Claim 10, Appelt teaches an electronic device wherein the contacts comprise ball grid array connections (Col. 5, lines 58+).

Regarding Claim 11, Appelt teaches an electronic device wherein the first substrate comprises a chip package 630 (Col. 5, lines 58+).

Regarding Claim 12, Appelt teaches an electronic device wherein the second substrate comprises a printed circuit board 620 (Col. 5, lines 58+).

Regarding Claim 20, Appelt teaches a connector system comprising a flexible substrate 610, a plurality of contacts 612, 613 formed on a first surface of the substrate, and a plurality of contacts 631-634 formed on a second surface of the substrate, wherein select contacts on the first surface of the substrate are offset from select contacts on the second surface of the substrate (Col. 5, lines 58+; Col. 6, lines 1+; FIG. 6).

Regarding Claim 21, Appelt teaches a connector system wherein the flexible substrate comprises a laminate material (Col. 5, lines 58+; Col. 6, lines 1+; FIG. 6).

Regarding Claim 22, Appelt teaches a connector system wherein the laminate material comprises a core, a dielectric material surrounding the core, and a solder mask (Col. 5, lines 58+; Col. 6, lines 1+; Col. 7, lines 1+; FIG. 6).

Regarding Claim 26, Appelt teaches a connector system wherein the core comprises a material selected from the group consisting of copper-invar-copper, copper, stainless steel, nickel, iron, and molybdenum (Col. 6, lines 1+; Col. 7, lines 1+; FIG. 6).

Regarding Claim 28, Appelt teaches a connector system wherein the contacts comprise ball grid array connections (Col. 5, lines 58+; Col. 6, lines 1+).

Regarding Claims 31-**42**, Appelt teachings inherently possess the methods of fabricating an electronic device and connector system and the corresponding mounting and assembling steps needed to construct the apparatus.

Regarding Claim 43, Appelt teaches a connector system comprising a flexible substrate and a plurality of contacts formed on a first surface and a second surface of the substrate, wherein the contacts are **alternately offset by a width of the contacts** (Col. 5, lines 58+; Col. 6, lines 1+; FIG. 6).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 5-7 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Appelt U.S. Patent No. 5,900,675 in view of Nguyen U.S. Patent No. 5,477,933. Regarding Claims 5-6 and 23-24, Appelt teaches a laminate material, but not a laminate material with through holes. Nguyen teaches a laminate material with plated through holes 19 that provide electrical connection between at least one contact on the first

surface 12 and one contact on the second surface 23 (Col. 3, lines 25+; FIG. 1, 3). It would be obvious to a person skilled in the art to provide the laminate material within the application through holes in order to provide electrical connection between the two surfaces. By connecting the through holes by a conductive path, the solder contacts are provided increased strength and durability in protection against detachment as well.

Regarding Claims 7 and 25, Appelt teaches an electronic device with a connection layer. Appelt does not teach a ground shield over the connection layer. It would be obvious to a person skilled in the art to include a ground shield over the connection layer in the present application in order to provide additional impedance control for the apparatus. By definition, a ground or ground shield protects against any type of static discharge or a surge in current, therefore including a ground shield to the current application does not constitute a patentable improvement to the invention.

2. Claims 9 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Appelt U.S. Patent No. 5,900,675 in view of Distefano U.S. Patent No. 6,309,915 B1. Appelt teaches a dielectric layer, but does not teach a dielectric layer comprising polyimide. Distefano teaches a dielectric layer comprising polyimide (Col. 8, lines 55+; Col. 10, lines 17+). It would be obvious to a person skilled in the art to fabricate the dielectric layer for the current application out of polyimide. By choosing to have the dielectric layer comprising polyimide, the flexibility of the dielectric layer is increased and done so with a common polymeric material such as polyimide.

3. Claims 13-19 and 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Appelt U.S. Patent No. 5,900,675 in view of Sheppard U.S. Patent No. 6,284,569 B1. Appelt does not teach a stiffener frame. Sheppard teaches a stiffener frame 100 providing stiffening for an integrated circuit package further comprising a stiffener frame that is attached to and surrounds the perimeter of a substrate or connector, wherein the stiffener is adhesively or removably attached to the substrate, wherein the stiffener frame comprises a material selected from the group consisting of: plastic, metal, and ceramic (Col. 1, lines 57+, Col. 2, lines 6+). It would be obvious to a person skilled in the art to include a stiffener frame to the present application in a manner to not only insure a more rigid and secure electronic device, but to also act as a heat sink in the thermal dissipation of excess heat from the chip package. It can be assumed that as long as the general structure, which comprising the stiffener adhesively attached to a planar laminate by means of an acrylic adhesive material, then the properties of a heat sink will be achieved. Also, by including a stiffener frame, the chance for detachment of substrates between one another and overall damage due to handling is decreased.

Response to Arguments

1. Applicant's arguments filed February 8, 2002 have been fully considered but they are not persuasive. Although the Applicant has attempted to narrow the scope of the Claims, the Appelt reference still reads on Claims 1-4, 8, 10-12, 20-22, 26, 28, and 31-43 regarding previous rejections. The Applicant includes the limitation of "alternating" or "alternatingly offset" in regards to the position of the contacts in Claims 1, 20, 31, and 37 within the Amendment. Appelt teaches alternating or alternately offset contacts in that contact 631 on the second surface sits in an alternating position with the second and third contacts counted from the left hand side on the first surface, as well as contact 634 on the second surface sits in an alternating position with the second and third contacts counted from the right hand side in the first surface (FIG.6). The Applicant does not specify completing to what extent specific contacts within the first or second surfaces alternate from each other, or by what vertical or horizontal position or relation by which these contacts alternate or are located, nor does he specify how many contacts are in an alternating pattern (i.e., half, all of them, etc.). The Applicant argues that the contacts of Appelt are spaced with no regard as to producing alternating contacts, however, it has been found that there is a consistent pattern by which the contacts are placed on the first and second surfaces. Regarding the newly added Claims 42-43, the method Claim 42 is simply treated as method Claims 31-42 in that the Appelt teachings inherently possess the methods of fabricating an electronic device and connector system and the corresponding mounting and assembling steps needed to construct the

apparatus. Regarding Claim 43, not only has the Appelt reference been applied to "alternating contacts" as discussed above, but additionally, nowhere in the Claims does the Applicant claim the contacts are all of a consistent width, therefore, the limitation of "alternatingly offset by a width of the contacts" is inconsistent and impossible to determine. For the foregoing reasons, Claims 1-4, 8, 10-12, 20-22, 26, 28, and 31-43 are anticipated by the Appelt reference. Accordingly, the Examiner's rejection over Appelt under 35 U.S.C. 102(b) is upheld.

2. Regarding Claims 5-7 and 23-25, the Applicant fails to specifically point out how the language of these Claims patentably differentiates themselves from the applied art and thus the rejection is repeated.

3. Regarding Claims 9 and 27, the Applicant fails to specifically point out how the language of these Claims patentably differentiates themselves from the applied art and thus the rejection is repeated.

4. Regarding Claims 13-19 and 29-30, the Applicant fails to specifically point out how the language of these Claims patentably differentiates themselves from the applied art and thus the rejection is repeated.

Prior Art

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
 - Jimarez U.S. Patent No. 6,191,952 B1 discloses a flip-chip electronic package comprising a compliant surface layer included on an interconnect carrier including a solder mask, a chip, a substrate, or printed circuit board, and solder balls arranged in a ball grid array to connect the chip to the carrier to the substrate.
 - Susko U.S. Patent No. 6,177,728 B1 discloses an integrated circuit chip device comprising a chip, a carrier comprising a thermoplastic material layer, a glass filled epoxy layer, and an elastic layer, a printed circuit board, and solder balls arranged in a ball grid array to connect the chip to the carrier to the printed circuit board.
 - Caletka U.S. Patent No. 6,104,093 discloses a thermally enhanced flip chip package comprising a chip and a laminate substrate electrically connected to the chip by means of solder balls.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael L. Lindinger whose telephone number is (703) 305-0618. The examiner can normally be reached on Monday-Thursday (7:30-6).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Martin can be reached on (703) 308-3121. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3431 for regular communications and (703) 305-3431 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Michael L. Lindinger
Patent Examiner
Art Unit 2841

MLL
March 6, 2002



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